Supercomputing Challenge

by David Knapp

My friend David Blackledge as a young child was very creative and shall we say, a bit unusual. I remember vividly walking with him through an empty field. He spotted some discarded object which to my normal eye looked like trash. To my surprise, he picked it up and found a use for it. I forget if it was a ball or some broken widget; it sticks in my mind that he didn't mind looking at something that someone else would have discarded and finding a creative use for it.

Early on, David showed a knack for art and computer art. I remember coming to his house on occasion and enjoying the cool picture he had done.

My earliest memories at the Blackledge house were before the addition that opened up the wall in the kitchen. There was the mouse sign on the wall.[i] I greatly enjoyed all the laughing and constant joking. I remember thinking it was cool and trying to also tell jokes. I imagine some of my young jokes weren't that funny, but the kind Blackledges laughed with me anyway. I also discovered that the Blackledges had orange juice in their fridge. For me, orange juice was a special treat. However, whenever I visited, sure enough, there was a pitcher of orange juice and I was allowed to pour myself a glassful. Whoo hoo!

Shawn Larson's birthday party, circa 7th grade, Albuquerque. Shawn is front, center; David Knapp at left; David Blackledge at back, right. On the left is Jeremy King, who later became the freshman year roommate of David B. at NM State. On the right is Christopher Bordlemay, Shawn's friend from Grant Middle School. Shawn and David K. are wearing the medical hair caps issued by Photon, the first commercial lasertag center. Date: c. 1985.

The name Blackledge became synonymous with good friend. For the year we took music together in elementary school, David offered to carry my trumpet case along with his case so that he was balanced. While we were taking cub scouts together, the den was held at David's house. My mom and I would walk over and hop the fence. After observing us do that for a while, Mrs. B. had a special installation of a back gate and named it the Alice B. Knapp Memorial Gate. From that time forward, it was always a welcome expectation to walk on over, let myself in through the back gate, and walk on into the house to find David to play. This was unnerving to my parents who made sure I called first or was expected. David and family didn't seem to care so much and always enjoyed having me visit. Very hospitable ! :)

The Blackledges also helped me grow up as a young man and help round off some rough edges. I remember a couple instances with Mr. B.:

1) As my soccer coach, he inspired us to run, play, and have a great time as a team playing soccer. I also remember very early in my soccer career noticing how fun it was to trip the people I was playing. Anyway, I remember Mr. B. making it very clear to me that this unsportsmanlike behavior was absolutely unacceptable and I was to trip no more. The lesson stuck, and I learned to play fair.

2) In another event, I remember David playing baseball. I was invited to join him at a game. I remember having fun knocking David's hat off his head. While enjoyable for me, this was certainly unkind to David and not a thing a friend should do. I remember Mr. B. getting very, very mad. Not in a shouting, physical way. But, it was clear that this was making him upset, and he was able to communicate to me that this was unacceptable. I remember getting the point, and deciding to stop. (Sorry David! My bad!) Of course the true revenge for our bad behavior as kids is that we get to try to stop our own kids from doing similar wicked, frustrating things. Stop hitting your brother! Don't grab the dog's fur! Don't take scissors to that new pair of swim goggle straps! Yup...parenthood is a dish sometimes served cold. :)

When we entered Manzano High, we had a wonderful teacher named Mrs. Debbie Firstenburg who taught honors English and history. One of her big things was keeping an organized notebook. To check our organizational skills, she would have a kamikaze event randomly where she would ask for a given piece of paper, and we had a time limit to retrieve the paper. Compared to many students, David and I (and our friend Chris) had less than perfectly organized notebooks. In fact, they were very disheveled. Nevertheless, we generally managed to pass each notebook check. At the end of the year, we each had a very thick notebook filled with all kinds of notes, assignments, and tests from Mrs. Firstenburg's class. I caught a ride with David on the last day of school. David had carefully set his notebook on the top of the car as he loaded everything. Later, while we were driving down the road, there was a sudden gut wrenching realization. The notebook had been left on his car as we drove away!

David circled the car around, and we retraced the route back to the school. At an intersection, there was a virtual snow cloud of scattered notebook papers. Like a poof of feathers after a baseball has intercepted a bird, the notebook had essentially exploded on contact and the wind was scattering papers everywhere! We hurriedly parked, and tried to hunt down every paper. They were stuffed in a cardboard box, and never reconstituted into the famed Firstenburg notebook.

Editor's note: Bonnie and I came across Mrs. Firstenberg a year or three ago: now retired from teaching, she was working as a volunteer at the Japanese Garden in the BioPark! I'm so glad that all you guys were able to experience her as a master teacher. Debbie Firstenberg was also Doug's favorite teacher. He claimed she was the only teacher that really prepared him for college.

Doug's "Mrs. Firstenberg Story": When she was teaching Doug's class about Roman society, she separated the class into Citizens, Slaves, and Women. The point was that only Citizens of Rome had any privileges. Doug played his role as Citizen so well that after class several of the girls ("Women") attacked him physically!

I requested that David K. relate the story of The Great Supercomputing Challenge - what it was, how the guys decided to go for it, the process and outcome.

The question caused all the creatures in the Mos Eisley cantina to pause what they were doing, put down their blue milk, and look over at the table where the strangers sat.

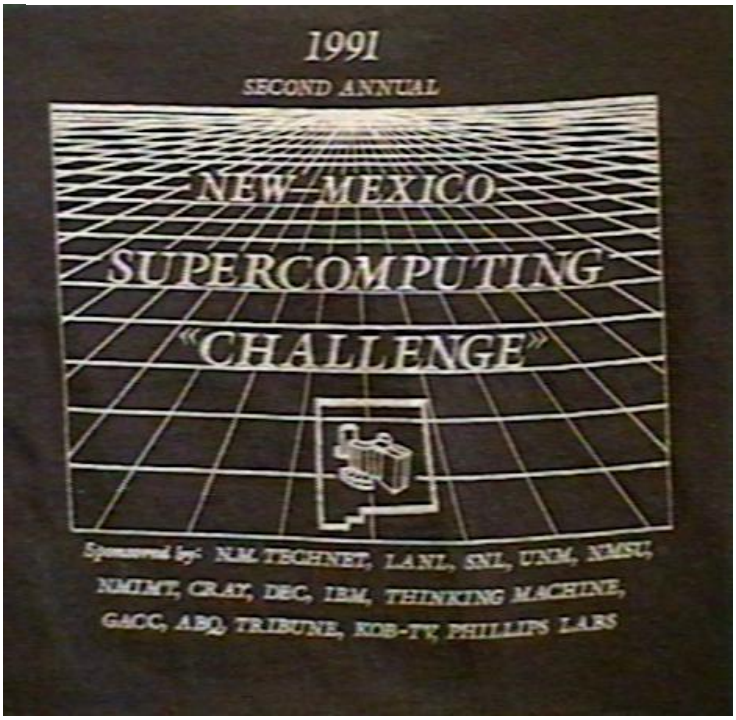
Well, Jedi Master Blackledge, that was a long time ago. Before the internet as we know it existed. It's a story that involved teenagers running wild on our nation's most powerful computer systems; teens just letting themselves into secure areas at a nuclear weapons lab; and a Los Alamos laboratory computer system being dismantled without permission by one of the teens in order to install unauthorized hardware to the shock of all lab employees who became aware of it.

David Blackledge, Dean Lavallee, Shawn Larson, and I were all good friends in our high school days. We had also taken classes at the same magnet school (Career Enrichment Center- CEC) our junior year. During that year, David Blackledge and I decided to apply to be hired as paid interns at Sandia National Labs during our senior year in high school (1991-1992). (I was working at the Air Force Phillips Laboratory as an unpaid apprentice my sophomore and junior years, and enjoying it greatly. I enjoyed helping them trouble shoot their computer hardware, and fix hardware /software. This is important later.)

The internship at Sandia Labs was a great opportunity through the gifted program that involved working full-time in the summer and part time (~20 hours) during the school year. David and I filled out our paperwork, and our schools were eventually visited by serious looking government agents for the background check to see if we were into drugs, communism, or criminal mischief. They interviewed our friends to their great amusement. The way the interview worked was each friend was called into the office where they were taken into a secure back room and asked a series of questions.

Some friends thought we had been confused with a major criminal or were being accidentally suspected of major wrongdoing. Dean Lavallee remembers cracking up laughing when asked if I had ever done any drugs. Realizing that might seem suspicious, he mentioned to the agent that I was actually not at all into drugs; in fact, my high school era (joking) idea for fixing the drug problem involved mandatory drug testing and the death penalty for those caught. It would quickly eliminate the problem.

Our good friend Chris Baca was also suitably impressed and joked with us that he told them about all the worst crimes that he could come up with. (In High School, Chris looked like a total heavy metal/hard rocking/spiked metal jewelry rough type, but who was actually a very nice, smart guy who fit in very well with us in all of our honors classes; he's a normal looking attorney in Dallas now). Anyway, David and I were issued Q clearances and each had a great time working at Sandia Labs in the summer and during our school year. This later factored into the challenge.



Later during 1991-1992, we heard about the High School Supercomputing Challenge through CEC. This was the 2nd Annual Supercomputing challenge. They let different high schools form teams, get assigned a mentor, and be provided dial up access to our nation's most powerful computers.We had virtually unlimited (as far as we could tell) computer time given to us on the Thinking Machine (first massively parallel supercomputer) and high end Cray Supercomputers at Sandia National Labs and Los Alamos National labs. We thought that sounded fun and signed up.

At this point in the story, I should note that there were very not that many high school aged people in the world that knew about how dial up modems worked, how to connect to computer bulletin board systems, and how to use a command line interface. David, Shawn, and I were all computer experts for our age and were well versed in connecting to other computers way before web browsers, wifi, cable modems, and routers. Cutting edge graphics was VGA on a PC at 320 wide X 240 tall pixels with 256 colors or 640 X 480 with 16 colors. We all dreamed of faster machines with more colors on the screen at once and more resolution. We were also into Fractal art. There was a cool program called Fractal Integer (FRACTINT) that generated really awesome patterns using chaos theory and mathematical formulas. Very small changes in initial conditions completely changed the patterns. Fractal art also had the properties of being able to infinitely zoom into the picture and continue to generate patterns that were new but self-similar. Each fractal image could take minutes to hours to generate on our desktop PCs.

Shawn had also gotten us into a form of music called MODs. Since computers were pretty limited in capabilities, they were unable to play back fully recorded digital quality MP3s like today. Instead, different sounds were synthesized and synchronized to play computer generated music. Some sounds could be sampled to then be played back at different times and frequencies for a given song. MOD files included the script and instrument samples for a given song. On computer bulletin board systems, people could send emails to each other, post files like MODs or programs like FRACTINT, text

chat with each other (only on high end bulletin board systems with more than one phone line coming in), and participate in online forums.

The access to the supercomputers was provided by having our computers call a number, connect, and then be presented with a command line text interface much like MS-DOS. We could then run programs such as a text based editor to write software, or to compile and run a program. Our team decided that it would be pretty cool to create a program that took a fractal such as the Mandelbrot Set and generate a video showing a zoom into the fractal. Since the super computer time was free, we thought this would be cool. [I also remember trying use my supercomputer access to impress a girl who was over at my house for a school project. She made polite remarks of appreciation but unfortunately was not suddenly transformed into a doe-eyed computer programming groupie.]

Our team progressed on the project, and was able to create a program that used a supercomputer to generate the fractal image. Display was a problem, since we didn't have a graphics based terminal connection to the supercomputer. Our own computers and ability to program a video file player were also limited. [As a side note, our group got to visit a computer lab at Air Force Phillips Lab, and meet a guy who had invented a pioneering way of compressing video. This became the foundation for motion JPEG which is used in a similar form on everything from Blu-rays to DVDs to Netflix to YouTube. He had a really cool computer workstation with lots of resolution and lots of colors. I remember also liking the image of the cute girl in a swimsuit as his computer wallpaper. Thumbs up from the teenage boy!] Anyway, we struggled a little to capture our original vision since it was growing beyond our resources to accomplish. So, we decided to take a new approach.

One of the PC programs we had was an editor for creating our own MOD files and music. We figured out how to write commands into a file that would take the place of keyboard input. Then, we created a computer program that took the fractal image data that we had generated, transformed it into music patterns, and writing those patterns into a new MOD file using an automatically generated input file. Essentially, the computer automatically converted a fractal image into commands that it executed in the MOD music editor to create a song. Finally, we assigned instruments to the music tracks, and picked the best pieces for submission. To be played, the computer required a sound card (uncommon on office computers at the time) and the appropriate MOD player.

Our team was selected to go to the finals, and we were given a free trip with a CEC teacher up to Los Alamos to be interviewed by the judges. Since it was impractical to haul one of our computers up to Los Alamos, we decided to only take the sound card along with our software.

In Los Alamos, David and I used our Sandia Labs badges to wander around the closed areas and do a little exploring. Since Sandia badges worked in Los Alamos, we had free reign of the place and felt like insiders.

Later, our team was taken to a computer lab and left to set up and get ready for our interview. We quickly realized that nobody had communicated that we needed to install a sound card, and we were essentially left alone with a deadline to be ready for the judges. If I recall correctly, the computer they gave us was incompatible with the bus

interface we needed for our sound card. To the shock of my teammates, I decided to grab a different computer down the hallway that was compatible and start dis-assembling it. I reassured them that it was no big deal, I had done this all the time at the Phillips Lab. Plus, I thought, I'm a badged Sandia employee with a Q clearance. Of course, I can disassemble their computers without permission. My partners in crime came around, and started helping.

When the Los Alamos employees came to check on us, they were horrified to find one of their (Unclassified) machines from a different area in a state of disassembly, with an unauthorized piece of hardware installed, and our team of young teenaged men getting ready to tell them about our cool project. We were quietly asked to go to another room to wait while they figured out what they should possibly do.

The Los Alamos employees eventually decided that we could install our sound card, and we presented our project. None of us actually played any instruments, knew anything about music theory, or had ever composed a song before. However, by careful selection of instruments coupled with our fractal generated patterns, we had managed to generate some fun sounding tracks that could charitably be called music.

On our way home on the CEC bus, our CEC teacher told us that Los Alamos people instructed him to give us a very stern talking to for taking apart their computer without permission. He smiled in a boys will be boys kind of way, let us know gently that that wasn't the best of ideas, and congratulated us on our hard work and making it to the finals.

A few weeks later, we attended the ceremony where they would announce winners of the Supercomputing Challenge. Our team didn't manage to place (1st/2nd/3rd), but we were given an honorable mention. They created a video highlighting the projects, and our music was featured as the sound track. The video tape probably exists on a shelf somewhere in a library or lab. The 1st place team was given a $30,000 graphics workstation for their school to use for a year. The top finishers were given scholarships and prizes. Along with all the other participants, we received t-shirts. That was ok. We were very happy to have been part of it.

… and does evidence exist? Possibly … from a reply from Supercomputing Challenge Consultant, 9 Sept 2020:

> Unfortunately we have not digitized any of the information from before 1995. The video and final reports and some pictures are probably in a box in storage and I'm not sure how easy it would be to find the box(es) and then to find anything related to your team.

Editor's note: And thus they all continue to proudly wear their T-shirts to this day. Well, at least one of the Davids does ...

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[i] "May the mouse never leave the Blackledge pantry with a teardrop in its eye." *(From the estate of Dorothy Marita Forrant Blackledge, circa 1971. 2020 location: Stalgren Ct, Albuquerque, NM, USA).*